

REMARKS

In the present Amendment, claim 1 has been amended to recite that the adsorbed fine particles have a size range of from 1 nm to 300 nm. Support for this amendment may be found, for example, at page 12 lines 13 to 16 of the specification. No new matter has been added, and entry of the Amendment is respectfully requested.

Upon entry of the Amendment, claims 1-4 will be pending.

In Paragraph No. 3 of the Action, claims 1-4 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Horowitz et al. ("Horowitz").

Applicants submit that this rejection should be withdrawn because Horowitz does not disclose or render obvious the functional surface member of the present invention. The present claims are patentable over Horowitz.

As recited in independent claim 1, the present invention relates to a functional surface member. The surface member includes a support having a surface to which a graft polymer chain having a nonionic polar group in the side chains thereof is bonded. A layer which includes both the graft polymer and adsorbed fine particles capable of polarly bonding to the nonionic polar groups in the side chains of the graft polymer is provided on the surface. Claim 1 further recites that the nonionic polar group is a heteroaromatic group having a nitrogen atom or a sulfur atom and the adsorbed fine particles have a size range of from 1 nm to 300 nm.

With regard to Applicants' arguments that Horowitz's continuous copper layer is not the same as the claimed layer of adsorbed fine particles, the Examiner notes "that the continuous copper layer taught by Horowitz is formed by adsorbing very fine copper crystals or particles to

the grafted polymer surface and hence is a layer of adsorbed particles and cannot be directly compared to a sheet of glass vs. a pile of sand considering sand is fused in order to produce the glass and not just piled on top of itself.”

In response, Applicants submit that if one reviews the portions of Horowitz cited by the Examiner (column 2, line 56 to column 3, line 12 and column 4, lines 14-68), it is clear, as has been previously explained to the Examiner, that Horowitz plates a continuous layer of copper onto the substrate using an electroless copper solution. As stated in Horowitz:

When the grafted polymerized surface coating is immersed in electroless copper solution, Cu^{++} is reduced to metallic copper by the electroless copper solution which contains formaldehyde or other reducing agents. The reduction is nucleated by the metallic silver atoms which are present and tightly bound in the interstices of the grafted chains of the polymeric coating. The metallic copper nucleated on the silver atoms further autocatalyzes the reduction of copper ions from the electroless copper solution and thus metallizes the plastic substrates. Since the metallic copper is deposited in the form of crystals around the silver atoms and the silver atoms are held ionically or by polar interaction with the grafted chains of the coating, the metallic surface which is formed on the coating is bound strongly to the plastic substrate. The adhesion of the metallized coating compares favorably with a metallic bond.

The Examiner's understanding that the copper layer of Horowitz is formed by “adsorbing very fine copper crystals or particles” to the grafted polymer surface is incorrect. The copper in the continuous copper layer of Horowitz coats from ions of Cu^{++} in solution. The continuous copper layer itself would of course be in the form of copper crystals since most metals are in crystalline form and not amorphous unless a special processing is undertaken to make them amorphous. But the Examiner seems to think that there are copper crystals or particles in the electroless copper solution of Horowitz which is incorrect.

Additionally, in response to Applicants' arguments with respect to the finely divided metallic silver not being the same as the layer having thereon adsorbed fine particles, the Examiner notes "once again" the teachings of Horowitz, particularly with reference to Reaction 6, read upon the instantly claimed invention. With regard to Applicants' arguments that the size of the metallic silver in Horowitz is considerably smaller than the instantly claimed adsorbed particles, the Examiner notes that the particle size is not claimed.

With regard to the finely divided metallic silver disclosed in Horowitz, although the size of the metallic silver is not entirely clear from Horowitz's disclosure, it appears from the mechanism disclosed in Horowitz that the size of the metallic silver would be an atomic size, which is considerably smaller than that of the adsorbed fine particles in the present invention. In order to clarify this distinction between the invention disclosed in Horowitz and the presently claimed invention, claim 1 has been amended to recite the adsorbed fine particles have a size range of from 1 nm to 300 nm. Thus, the Examiner's assertion that "the particle size [of the adsorbed fine particles] is not claimed," is addressed by the present Amendment.

In view of the above, Applicants respectfully submit that the section 103 rejection of claims 1-4 based on Horowitz should be reconsidered and withdrawn.

Allowance is respectfully requested. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Amendment Under 37 C.F.R. § 1.111
U.S. Appln. No.: 10/663,845

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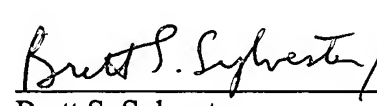
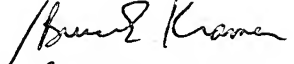
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